

please enter
IN THE CLAIMS:

Can
3/15/05
This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Previously Presented) A cellular radio network including allocated radio frequencies reused in cells, comprising:

said allocated radio frequencies being divided into regular radio frequencies for which lower frequency reuse is utilized to achieve a seamless overall coverage, and super-reuse frequencies to which high frequency reuse is applied to provide a high traffic carrying capacity;

at least one of said cells being a regular cell having both at least one regular frequency and at least one super-reuse frequency, so that said at least one regular frequency is intended to serve primarily in cell boundary regions and said at least one super-reuse frequency is intended to serve primarily in the vicinity of a base station, one of the regular frequencies being a BCCH frequency of the regular cell; and

at least one microcell wherein all frequencies are super-reuse frequencies one of which is a BCCH frequency of the microcell,

a controller which controls traffic load distribution in a regular cell between said at least one regular and said at least one super-reuse frequency by intra-cell handovers induced by estimated interference on said at least one super-reuse frequency, and which controls traffic load distribution between the regular cell and said microcell by inter-cell handovers based on estimated interference on at least one super-reuse frequency in the microcell.

2. (Previously Presented) The cellular radio network as claimed in claim 1, wherein a handover from a regular frequency to a super-reuse frequency occurs at a predetermined interference level on said super-reuse frequency, and

wherein a handover from a super-reuse frequency to a regular frequency occurs when there is too poor an interference level on said super-reuse frequency.

3. (Previously Presented) The system as claimed in claim 1,

wherein a BCCH frequency of the cell is a regular frequency, and wherein a radio frequency assigned in call-setup or handover from another cell is a regular frequency.

4. (Previously Presented) The cellular radio network as claimed in claim 1, further comprising:

at least one microcell having only super-reuse frequencies, one of said super-reuse frequencies being a BCCH frequency, and

call set-up in a microcell is barred, and said controller controls traffic load distribution between regular cells and said microcell by inter-cell handovers induced by an interference level in said microcell.

5. (Previously Presented) The cellular radio network as claimed in claim 1, comprising:

a mobile-assisted handover procedure in which a mobile station measures a signal receiving level of a serving cell and a signal level of adjacent cells and forwards said measurement results to said handover controller of said cellular network, wherein said handover controller estimates an interference level on said super-reuse frequencies of said serving cell based on said measurement results.

6. (Previously Presented) The cellular radio network as claimed in claim 5, wherein one or more adjacent cells have been assigned to each super-reuse frequency of said serving cell, said measured receiving level of said adjacent cell being used to estimate interference on said super-reuse frequency.

7. (Previously Presented) The cellular radio network as claimed in claim 5, wherein said measurement results of said mobile station only concern a limited number of ambient cells, and that at least one reference cell has been assigned to at least one super-reuse frequency of said serving cell from among said ambient cells, said reference cell having an interference profile of a type similar to an interference profile of a more remote cell which is a potential source of interference on said super-reuse frequency but cannot be directly measured by said mobile station, and that said handover controller estimates said interference level caused by said more remote cell on said super-reuse frequency, using said measured signal level of said reference cell.

8. (Previously Presented) The cellular radio network as claimed in claim 7, wherein a handover algorithm is adapted to estimate a signal level of an interfering cell by correcting said measured receiving level of said reference cell taking into account a difference in signal levels of said reference cell and an actual interfering cell.

9. (Previously Presented) A method for increasing traffic carrying capacity in a cellular radio system, comprising:

dividing radio frequencies of said cellular radio network into regular radio frequencies for which lower frequency reuse is utilized to achieve seamless overall coverage, and super-reuse frequencies to which higher frequency reuse is applied to provide a high traffic carrying capacity;

allocating to some cells of said cellular radio network both at least one regular frequency and at least one super-reuse frequency so that said regular frequency is intended to serve primarily in cell boundary regions and said super-reuse frequency is intended to serve in a vicinity of a base station;

allocating a regular frequency as a BCCH frequency in said some of the cells;

providing at least one microcell wherein all frequencies are super-reuse frequencies one of which is a BCCH frequency of the microcell;

controlling traffic load distribution in a regular cell between said at least one regular and said at least one super-reuse frequency by intra-cell handovers induced by estimated interference on said at least one super-reuse frequency; and

controlling traffic load distribution between the regular cell and said microcell by inter-cell handovers based on estimated interference on at least one super-reuse frequency in the microcell.

10. (Previously Presented) The method as claimed in claim 9, further comprising:
performing an intra-cell handover from a regular frequency to a super-reuse frequency when said super-reuse frequency has a predetermined interference level; and

performing a handover from a super-reuse frequency to a regular frequency when said super-reuse frequency has too poor an interference level.

11. (Previously Presented) The method as claimed in claim 9, further comprising:

allocating a regular frequency as a BCCH frequency of said cell in each case; and
assigning a regular frequency in call set-up or in a handover from another cell in each
case.

12. (Previously Presented) The method as claimed in claim 9, further comprising:
measuring a signal receiving level and quality of a serving cell at said mobile station;
measuring said signal receiving level of cells ambient to said serving cell at said
mobile station;
forwarding measurement results from said mobile station to said cellular radio
network; and
estimating an interference level on said super-reuse frequencies of said serving cell
based on said measurement results.

13. (Previously Presented) The method as claimed in claim 12, further
comprising:
assigning one or more adjacent cells to each super-reuse frequency of said serving
cell, said measured receiving level of the adjacent cell being used to estimate said
interference level on said super-reuse frequency.

14. (Previously Presented) The method as claimed in claim 12,
wherein said measurement results reported by said mobile station only concern a
limited number of ambient cells,
said method further comprising:
assigning at least one reference cell to at least one super-reuse frequency of said
serving cell from among said ambient cells, said reference cell having an interference profile
of a type similar to an interference profile of a more remote cell which is a potential source of
interference on said super-reuse frequency but cannot be directly measured by said mobile
station; and
estimating an interference level caused by said more remote cell on said super-reuse
frequency using said measured signal level of said reference cell.

15. (Previously Presented) The method as claimed in claim 14, further
comprising:

correcting said measured signal level of said reference cell taking into account a difference in signal levels of said reference cell and said remote cell in estimating said interference level.

16. (Previously Presented) A network element for controlling traffic load distribution in a cellular radio system, comprising

means for allocating to some of radio cells both at least one regular frequency and at least one super-reuse frequency so that the regular frequency is intended to serve primarily in cell boundary regions and the super-reuse frequency is intended to serve primarily in the vicinity of a base station;

means for allocating a regular frequency as a BCCH frequency in said some of the cells;

means for allocating to a super-reuse frequency as a BCCH frequency in at least one microcell in which all frequencies are super-reuse frequencies;

means for controlling traffic load distribution in the regular cell between said at least one regular and said at least one super-reuse frequency by means of intra-cell handovers induced by estimated interference on said at least one super-reuse frequency; and

means for controlling traffic load distribution between the regular cell and said microcell by inter-cell handovers based on estimated interference on at least one super-reuse frequency in the microcell.

17. (Currently Amended) A network element for controlling traffic load distribution in a cellular radio system, comprising

means for allocating to some of radio cells both at least one regular frequency and at least one super-reuse frequency so that the regular frequency is intended to serve primarily in cell boundary regions and the super-reuse frequency is intended to serve primarily in the vicinity of a base station;

means for allocating a regular frequency as a BCCH frequency in said some of the cells, such that in said some of the cells, a radio frequency assigned in call-setup and handover from another cell is always a regular frequency; and

means for controlling traffic load distribution in the regular cell between said at least one regular and said at least one super-reuse frequency by means of intra-cell handovers induced by estimated interference on said at least one super-reuse frequency.